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Analytical calculation of distributions of the electron density and the concentration of impurity ions in a thermal dusty plasma using the jellium model for condensed particles

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Abstract

© 2017, Pleiades Publishing, Ltd.Self-consistent spatial distributions of the electron density in the entire volume of condensed-matter particles and the surrounding plasma, as well as distributions of the concentration of ions of easily ionized impurity atoms, are obtained using the jellium model to describe particles. It is established that electron emission from condensed particles in a thermal dusty plasma containing an impurity of an easily ionized element may weaken with an increase in temperature. The electron emission from particles is shown to increase with a decrease in their radius at a constant temperature. A plasma region with violated ionization equilibrium is found to form near the surface of condensed particles.

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